



## EUROPEAN PATENT APPLICATION

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④ An improved structure for single-hand-operating umbrella.

④ An umbrella includes ribs (07), supporting rods (05a, 05b) for placing a cloth cover thereon, connecting rods (06) for supporting the ribs, a main strut (01), and an inside control rod (10). The supporting rods are jointed and are connected with the ribs at the upper ends, and also with a holding ring (02) on the lower ends of the main strut. The connecting rods (06) are installed between the supporting rods and a holding ring (04) which can move up and down on the main strut where the ribs are installed. The main strut (01) comprises a tube having an open-close control rod (10) inside which can also move up and down. A retractable spring (15) is installed at the end near the umbrella tail portion. An exposed pushable knuckle (100), a read-dent or latch device (100a) and a latch-like snap pin (11) are disposed on the control rod. When the umbrella is opened, the snap pin is pressed into the strut interior by the slideable holding ring (04) and springs outside when the umbrella is closed. It will stay beneath the holding ring to prevent the ring from further sliding down or to prevent extra extending of the ribs. The open-close control rod (10) and slideable holding ring (04) are jointed together with a pin (14) which extends through aligned grooves (012) in the main strut provided for the slideable holding ring to move up and down. There are three openings (010a, 010b, 011) on the main strut which provides positioning for the knuckle, the read-dent device and the snap pin with checking effect.

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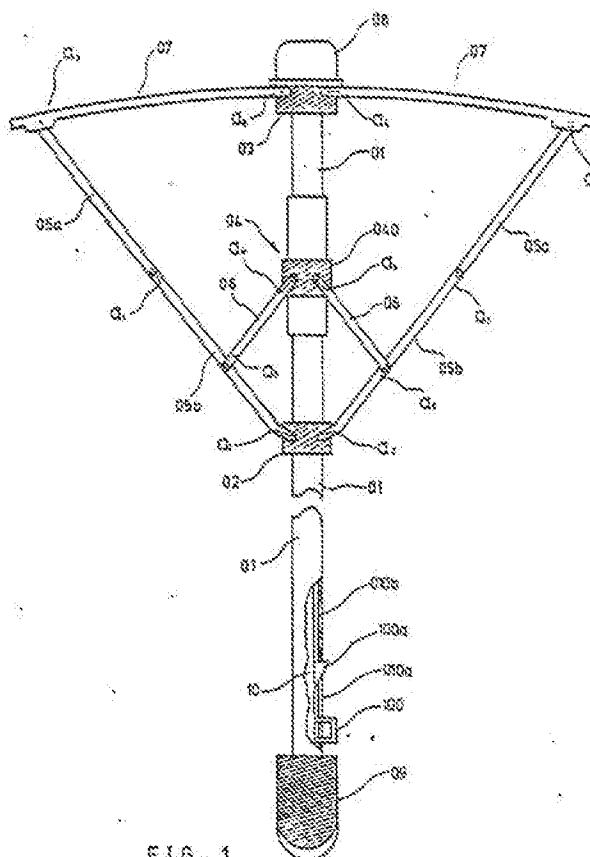


FIG. 1

## An improved structure for single-hand-operating umbrella

This invention relates to an improved umbrella which may be completely controlled by a single hand.

Conventional umbrellas, whether having extensible struts or not, must be operated by both hands, at least when closing. Although automatic opening umbrellas have been used wherein a control button is actuated on the handle, the umbrella still needs two hands at least for closing. Such umbrellas are not practically convenient, especially when the user is holding something else with one of his or her hands. This revolutionary invention is designed to solve the problem.

The major parts of the new umbrella include ribs, supporting rods for placing a cloth cover theron, connecting rods for supporting the ribs, a main strut, and the inside control rod. Further features of the device are as follows:

The supporting rods are double-jointed and are connected with the ribs at the upper ends, and also with a holding ring on the lower ends of the main strut.

The connecting rods are installed between the supporting rods and a holding ring which can move up and down on the main strut where the ribs are installed.

The main strut comprises a cylinder-like barrel or tube having an open-close control rod inside which can also move up and down without horizontal movement/rotation. A retractable spring is installed at the end near the umbrella tall portion.

Conveniently, an exposed pushable knuckle, a reed-dent or latch device and a latch-like snap pin are disposed on the control rod, with the latch device disposed adjacent the handle of the umbrella. When the umbrella is opened, the snap pin is pressed into the strut interior by the slideable holding ring and springs outside when the umbrella is closed. It will stay beneath the holding ring to prevent the ring from further sliding down or to prevent extra extending of the ribs.

The open-close control rod and slideable holding ring are jointed together with a pin which extends through holes on the main strut. A groove is provided for the slideable holding ring to move up and down. Accordingly, the reed dent may be omitted although it is preferred to include it and to provide three openings on the main strut which provide positioning for the knuckle, the reed dent device and the snap pin with checking effect.

According to one aspect of the invention there is proposed an improved umbrella which may be opened or closed with a single hand comprising, in combination:

- (a) A main strut having a handle at its lower end
- (b) lower and upper holding rings fixedly mounted to said strut,
- (c) a movable holding ring mounted for movement on said strut between said lower and upper holding rings,
- (d) a plurality of ribs pivotally mounted to said upper holding ring,
- (e) supporting rod means pivotally connecting said ribs and said lower holding ring and with said supporting rod means being jointed
  - (f) connecting rod means for causing said ribs to open or close the umbrella
- (g) an open-close control rod disposed inside said main strut for operating said movable holding ring
  - (h) a plurality of spaced lower and upper joint pins passing through respective pin holes, said lower joint pin connecting the upper end of said control rod with said movable holding ring,
  - (i) a latch-like snap pin disposed below said joint pins,
  - (j) a (retractable tension) spring extending between said open-close control rod and said upper holding ring,
  - (k) a single-hand controllable knuckle disposed adjacent said handle and having a latch-like reed dent on its upper end,
  - (l) a plurality of openings disposed along said main strut,
  - (m) a pair of springs disposed between said control rod and said main strut for positioning said snap pin, knuckle and reed dent relative to said openings,
  - (n) and a groove disposed in said main strut and with said groove receiving said lower joint pin for sliding movement therein.
- (o) of said supporting rod means, with said movable holding ring surrounding said main strut, and a plurality of said connecting rod means disposed between the lower portion of said supporting rod means and said movable ring for controlling the umbrella operations. The open-close control rod is conveniently secured to said knuckle and said reed dent to control the umbrella operation. The connecting rod means and a portion of said jointed supporting rod means together form a movable means to control the pivotal operation of said ribs. Conveniently two of said openings are disposed near said handle and with the opening ends being engageable by said knuckle and reed dent to produce a blocking effect to hold all the parts in position.

The tension spring is disposed inside said main strut and said pair of springs are mounted on the inner wall of said main strut.

The present invention will now be described further, by way of example only, with reference to the accompanying drawings; in which:-

Figure 1 is a side elevation of an umbrella constructed in accordance with the aspects of the invention and with the umbrella in open position;

Figure 2 is a side elevation of the umbrella in closed position;

Figure 3 is a somewhat schematic showing of the device;

Figure 4 illustrates the open-close control;

Figure 5 is a structural sectional view of the main strut when the umbrella is in closed position; and

Figure 6 is a structural sectional view of the main strut when the umbrella is in open position.

The umbrella of the present invention looks similar to those of conventional types, but the interior structure is quite different and provides an entirely new product.

The main improvements in the device relate to the ribs, supporting rods, connecting rods, strut open-close control holding rings and the movable ring mentioned above.

Referring to the drawings, and particularly Figure 1, which illustrates the device in open position, a tubular main strut 01 is provided with a handle 09 at its lower end. A lower holding ring 02 is fixed on the main strut 01; and an upper holding ring 03 is fixed near the tail part 08 of the umbrella. A movable ring 04 is disposed between upper ring 03 and lower ring 02, with the movable ring 04 having an exposed portion 040.

A plurality of double-jointed supporting rods are provided with the rods being formed of portions 05a and 05b, with their foldable joint a; there-between. A joint a<sub>2</sub> is disposed between upper rod portions 05a and umbrella ribs 07; while a joint a<sub>3</sub> is disposed between the lower part of rib portions 05b and a lower ring 02.

Connecting rods 06 extend between the exposed portion 040 of movable ring 04 and the lower supporting rod portions 05b. The connecting rods are joined to the ring 04 and rod 05b, as at joints a<sub>4</sub> and a<sub>5</sub>.

The umbrella ribs 07 are connected between joints a<sub>2</sub> on the upper holding ring 03 and connect with the upper rib portions 05a, as indicated, at joints a<sub>3</sub>.

With the construction described above, it should be easy to understand that when movable holding ring 04 slides up and down, connecting rods 06 will be forced to push the lower part of the supporting rod 05b for rib-opening or closing, in view of the fact that holding rings 03 and 02 are fixed.

In the closed position shown in Figure 2 of the drawings, a latch-like snap pin 11 is disposed at the lower part of movable holding ring 04, which keeps the ring from sliding down due to gravitational forces.

Figure 3 illustrates the device in both closed and open positions (corresponding to first and second positions of the control rod), and is a combination of the showing of Figure 1 and 2; the open position being shown in dotted outline.

Figure 4 illustrates the open-close control rod 10 having a retractable spring 15 thereon. A pressable knuckle 100, reed dent or latch 100a, snap pin 11 and pin holes 150 and 151 are also shown.

Figures 5 and 6 illustrate the main strut in respective closed and open positions. Initially snap pin 11 will be pressed outside the main strut 01 through the opening or check hole 011 by spring plate 13 so as to keep the control rod and the movable holding ring in position and prevent extra extending of the ribs.

A pin 14 which connects the movable holding ring 04 and retractable spring 15 through a pin hold 150, is disposed in a groove 012 of main strut 01. Another pin 16 connects retractable spring 15, the upper holding ring 03 and main strut 01 through a pin hole 151.

Knuckle 100 extends outside the main strut 01 through opening 010a while reed dent 100a comes out through opening 010b. Reed dent 100a will be blocked by the upper end flange of opening 010b to fix up the open-close control 10.

When knuckle 100 is pressed in the direction of small t<sub>1</sub> to a considerable extent, reed dent 100a will be withdrawn from opening 010b and will be stuck out of biased through opening 010a in a direction opposite to arrow t<sub>2</sub>, due to the force of spring plate 12 on the control stick 10. It will stay there whilst the umbrella is open (see Figure 6).

When the umbrella is open and the retractable spring 15 is tightly pulled out, due to movement of controls stick 10 in direction t<sub>1</sub> to thereby store sufficient force for retraction, snap pin 11 will be pressed into the main strut 01. When knuckle 100 is pressed in the t<sub>2</sub>direction, the blocking force for the reed dent 100a will disappear, and the open-close control rod 10 will move back along direction t<sub>2</sub>by the retracting force of retractable spring 15, as shown in Figure 5. Since the open-close control

rod 10 matches closely with the inner wall of main strut 01, the entire device won't turn horizontally, so that reed dent device 100a and snap pin 11 accurately are fixed in holes 010b and 011.

It should thus be easy to open or close the umbrella, just by pushing on the knuckle 100.

Finally, the operational procedures are further explained:

For opening, hold the umbrella at the handle to point downward, press knuckle 100 with the finger, and the umbrella will open accordingly. The blocking force at the open-close control rod 10, snap pin 11 and reed dent 100a will be overcome, and the supporting rods 05a and 05b, as well as the umbrella itself, will extend outward by the force of gravity to facilitate the pressing operation for complete opening and locking.

For closing the umbrella, knuckle 100 is pressed upwardly to relieve the blocking force at the reed dent 100a around opening 010a. The umbrella will then close by the retracting force of spring 15.

#### Claims

1. An umbrella for opening and closing with a single hand comprising a main strut (01) having a handle (09) at its lower end, lower and upper holding rings (02, 03) fixedly mounted to said strut, a plurality of ribs (07) pivotally mounted to said upper holding ring (03), supporting rod means (05a, 05b) pivotally connecting said ribs (07) and said lower holding ring (02) with said supporting rod means being jointed (as), connecting rod means for causing said ribs (07) to open or close the umbrella, characterised by an open-close control rod (01) received in said main strut and slidable between first and second positions corresponding to closed and open positions of the umbrella, and a single-hand controlled knuckle (100) disposed adjacent said handle and controlling operation of latch means (11, 100a) locating said control rod in said first and second positions.

2. An umbrella as claimed in claim 1 in which said control rod operates a movable holding ring (04, 040) mounted for movement on said strut, disposed between said lower and upper holding rings and operating said connecting rod means, a lower joint pin (14) connecting the upper end of said control rod with said movable holding ring and received for sliding movement in a groove (012) disposed in said main strut.

3. An umbrella as claimed in claim 1 or 2 wherein in the first position the latch means (11, 100a, 100) co-operates with abutment means (011, 010b, 010a) of the main strut to prevent movement of the control rod in a direction to allow opening of

the umbrella and wherein in the second position the latch means (100a) co-operates with abutment means (010a) of the main strut to prevent movement of the control rod in a direction allowing closing of the umbrella.

4. An umbrella as claimed in any one of claims 1, 2, or 3 in which a spring (15) is provided to close the umbrella when the latch means is released for displacement of the control rod from its second position.

5. An umbrella as claimed in any one of claims 1 to 4 in which the latch means comprises a latch like snap pin (11), of the control rod, (10) which is co-operable with an abutment opening (011) in the main strut when the control rod is in its first position and a latch reed (100a), of the control rod, which is co-operable with an abutment opening (010a) in the main strut when the control rod is in its second position.

6. An umbrella as claimed in claim 5 in which the opening (010a) is a slot which also accommodates slidably a knuckle of the control rod for actuation of the latter to control the umbrella operation.

7. An umbrella as claimed in claim 5 or 6 in which the latch reed (100a) is receivable in an opening (010b), of the main strut, when the control rod is in its first position and wherein two of said openings (010a, 010b) are disposed near said handle.

8. An umbrella as claimed in claim 4 in which the spring (15) is a tension spring which is disposed inside said main strut and connected between the main strut and the control rod.

9. An umbrella as claimed in any one of the preceding claims in which a pair of springs (12, 13) are mounted on an inner wall of said main strut and act on said control rod for positioning the latch means in respective openings.

10. An umbrella as claimed in any one of claims 2 to 9 in which a plurality of said supporting rod means (05a, 05b) are provided said movable holding ring surrounding said main strut, and a plurality of said connecting rod means being disposed between the lower portion (05b) of said supporting rod means and said movable ring for controlling the umbrella operations, the connecting rod means (06) and portions (05b) of said jointed supporting rod means together forming a movable means to control the pivotal operation of said ribs (07).

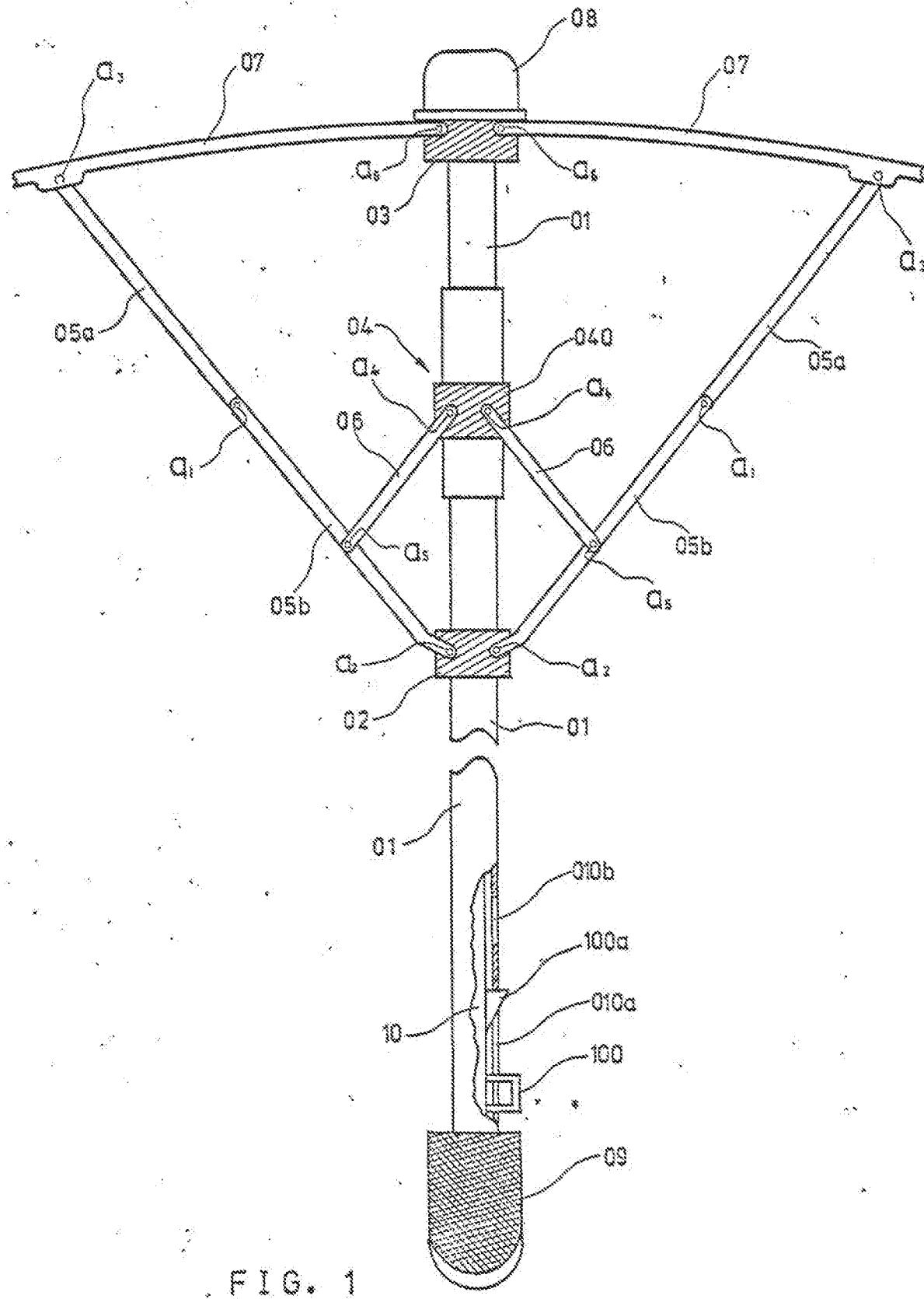


FIG. 1

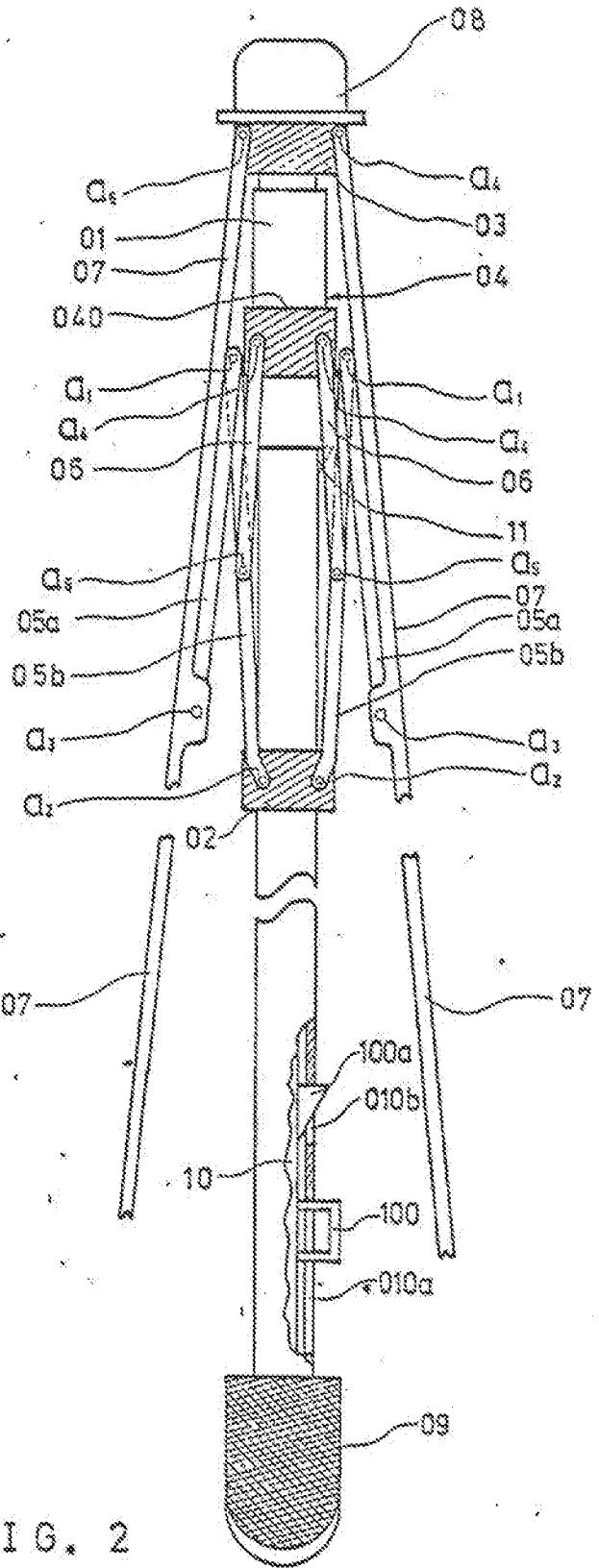


FIG. 2

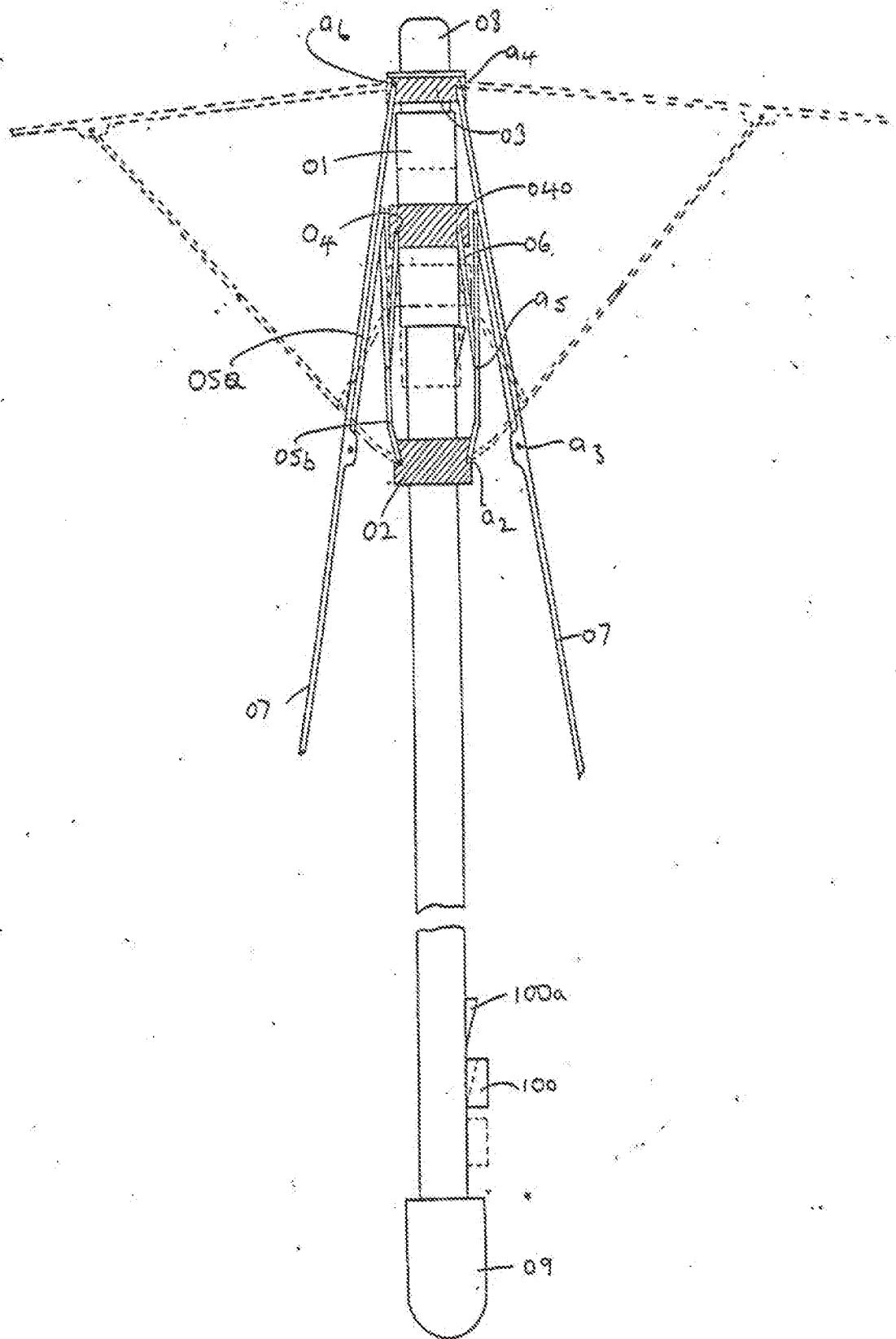


FIG.3

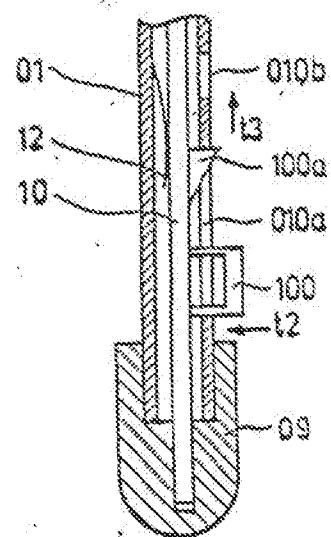
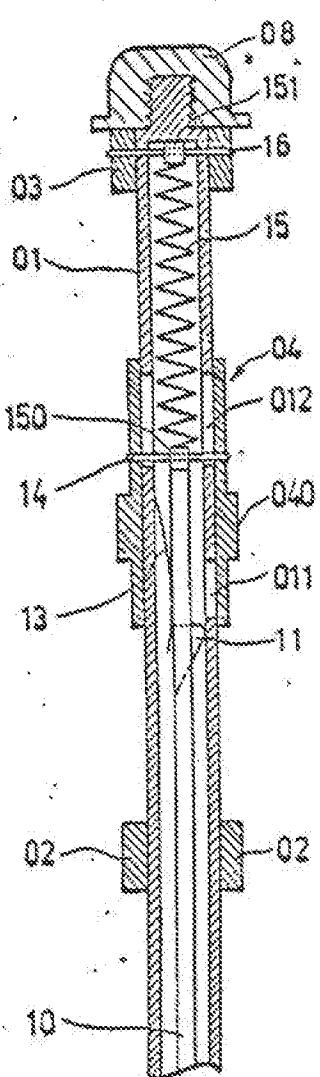


FIG.6

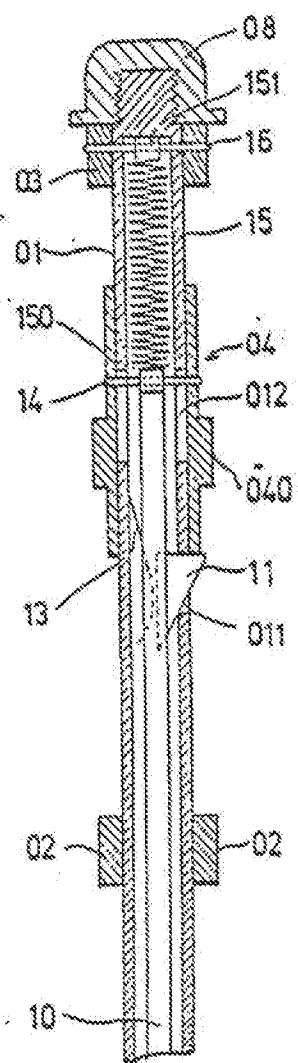


FIG.5

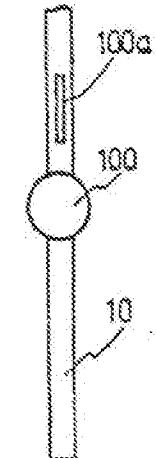
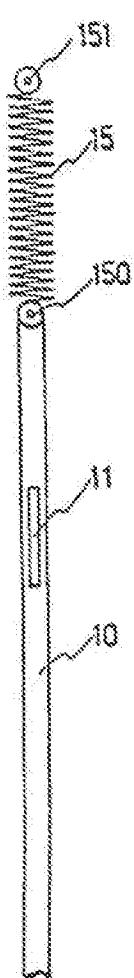


FIG.4



DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	EP-A-0 156 045 (DAY)		A 45 B 25/16
A	DE-A-1 940 821 (KITANI) ***** *****		
TECHNICAL FIELDS SEARCHED (Int. Cl.4)			
A 45 B			

The present search report has been drawn up for all claims

Place of search THE HAGUE	Date of completion of the search 24-03-1987	Examiner SIGWALT C.
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CATEGORY OF CITED DOCUMENTS

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Y : particularly relevant if combined with another document of the same category  
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